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EXAMINER	
ZIMMER, ANTHONY J	
ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
04/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/567,577	SCHUMACHER ET AL.	
	Examiner	Art Unit	
	ANTHONY J. ZIMMER	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-6 and 8-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-6, and 8-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Claim Objections

Claims 13, 15, and 18 are objected to because of the following informalities: The claims depend on a cancelled claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-2, 4-6, and 8-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 contains the limitation "a maximum temperature of no greater than 150°C prevails in the column." There is no support for this temperature range in the disclosure as originally filed. Applicant claims that support is found in cancelled claim 21 and in the specification on page 4, lines 27-30. However, claim 21 recited that "a maximum temperature of 150°C prevails in the column" and the citation in the specification recites a maximum temperature range of 150-500°C both of which do not support a range of "no greater than 150°C."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 4-6, and 8-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'271 (Great Britain 1197271) in view of Mangold '944.

In regard to claims 1 and 4, GB'271 teaches a process of purifying finely divided metal oxide particles formed by reaction of chlorides of the metals by hydrolytic or oxidizing gasses. See page 2, lines 56-72. Adding metal oxide particles containing hydrogen chloride and chlorine (residues of halide compounds), see page 1, lines 38-45, together with waste (reaction) gasses (as indicated by the design choice to widen the reaction tube in response to the entrance of these gasses, see page 3, lines 1-7), to the top of a vertical reaction tube (column) in which the metal oxide falls due to gravity against a mixture of steam (a counter-current feed); see page 2, lines 56-72; the purified metal oxides being removed at the bottom of the column and the steam containing the halide residues are removed at the head (top) of the column; see page 3, lines 1-7 and 35-39. A temperature of 400-600°C is in the column. See example 1.

GB'271 is silent in regard to the temperature difference between the bottom and the top of the column and the residence time of the particles.

In regard to the residence time, GB'271 does not indicate the density of the silicon dioxide used, which is needed to calculate the residence time. However, in Table 2 of Mangold, silicon dioxides produced by flame hydrolysis like the silica used in Example 1 of GB'271 and having similar surface areas to those used in Example 1 of GB'271 have densities in the range of 25-32 g/L; thus the density of the silicon dioxide used in GB'271 would necessarily fall in this range; corresponding to a residence time of 2.9 - 3.7 minutes, according to the reaction parameters in GB'271 Example 1.

Basis of calculation: (density of reactant)(volume of reactor)/

(rate of feed of reactant) = residence time

Furthermore, it would have been obvious to one of ordinary skill in the art to use the silicon dioxide particles of Mangold in the process of GB'271, if the density presented is not already inherent, because GB'271 teaches using metal oxide particles from a flame hydrolysis process (See page 1, lines 25-30), and Mangold is such a flame hydrolysis process producing silicon dioxide particles.

In regard to the temperature difference, GB'271 teaches providing heat in two vertically adjacent burners located at the lower end of the treatment zone (the bottom). See page 3, lines 8-17. Thus, a temperature gradient would be produced, with a higher temperature at the bottom of the column and a lower temperature at the top. In a reaction column of sufficient size, like the 300L tube used in Example 1, and with the feeding rates of Example 1, a temperature difference between the top of the column and the bottom of at least 20°C would necessarily be produced. Furthermore, the temperature profile of a continuous chemical system is a parameter that is routinely optimized in the chemical art, affecting the efficiency of the operation of the system, and fails to produce an unexpected result.

GB'271 teaches a temperature of 400-600°C but does not mention using a maximum temperature of no greater than 150°C. However, GB'271 teaches that temperatures of 200-500°C are effective. See page 1, lines 60-64. Though the given temperature does not fall in the given range, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05. In the instant case, the temperature of 150°C is significantly close to

the given range (and is a temperature at which necessary steam exists) that one skilled in the art would expect the temperature as being effective for purifying metal oxide particles.

Furthermore, temperature is a parameter routinely optimized in the chemical art and generally does not support patentability unless there is evidence indicating that such a temperature is critical. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In the instant case, the general temperature conditions of the claim are disclosed by the prior art as described above and the claimed temperature range has not been shown to be critical, thus the claimed maximum temperature range is not considered to patentably distinguish the claims from the prior art. See MPEP 2144.05 II. A. Moreover, selection of a process temperature is a matter of design choice and routine optimization that fails to produce an unexpected result. In particular one of ordinary skill in the art would have been motivated to lower the temperature in order to decrease energy costs.

In regard to claim 2, GB'271 teaches providing heat in two vertically adjacent burners located at the lower end of the treatment zone (the bottom). See page 3, lines 8-17. Thus, a temperature gradient would be produced, with a higher temperature at the bottom of the column and a lower temperature at the top. In a reaction column of sufficient size, like the 300L tube used in Example 1, with the feeding rates of Example 1, a temperature difference between the top of the column and the bottom of at least 20°C and in the range required by claim 2 would necessarily be produced. Furthermore,

the temperature profile of a continuous chemical system is a parameter that is routinely optimized in the chemical art, affecting the efficiency of the operation of the system, and fails to produce an unexpected result. In regard to claim 2, the upper limit of the temperature difference, it would have been obvious to one of ordinary skill in the art to optimize the temperature profile in the column in order to provide an upper limit in order to prevent undesirable effects on the product and in order to increase the safety of the reactor as sharp gradients within a reactor promote instability and produce undesirable results in the product.

In regard to claim 5, GB'271 is silent in regard to the temperature of the entering metal oxide particles. However, the particles provided to the deacidification process are from a flame hydrolysis or oxidizing process, ie. high temperature processes (see page 1, lines 10-51 of GB'271). It would have been obvious to one of ordinary skill in the art after the hydrolysis or oxidizing process, to keep the metal oxide particles at a temperature near the operation temperature of the purification column (400-600°C) in order to affect the predictable result of decreasing the energy demand of the purification column and thus the cost.

In regard to claim 6, GB'271 teaches 12.5 Nm^3 of steam/ 154 kg of silica in example 1. The density of steam at this condition is 0.590 kg/m^3 (engineeringtoolbox.com). Thus, GB'271 teaches the amount of steam that is introduced is 0.048 kg(/hr) per kg of metal oxide particles.

In regard to claims 8, 9, and 10, GB'271 does not teach plural columns. However, depending on the desired quality of the product, the quality of the provided

crude metal oxide particles, and the efficiency of the purification process, it would have been obvious to one of ordinary skill in the art to subject the metal oxide particles to a second purification process (i.e. passing the silica particles through another column), with the same conditions as the first, see claim 1 rejection above, in order to achieve the predictable result of producing a purer product.

In regard to claim 11, see above for the limitations of claim 2, GB'271 teaches a reactor temperature of 400-600°C. See page 2, lines 96-99. Overlapping ranges are prima facie obviousness. See MPEP 2144.05.

For the limitations of claims 12 and 13, see above for the limitations of claim 2; see claim 1 rejection above in regard to residence time.

In regard to claims 14-16, see above for the limitations of claim 2, 3, or 4. GB'271 is silent in regard to the temperature of the entering metal oxide particles. However, the particles provided to the deacidification process are from a flame hydrolysis or oxidizing process, high temperature processes (see page 1, lines 10-51 of GB'271). It would have been obvious to one of ordinary skill in the art after the hydrolysis or oxidizing process, to keep the metal oxide particles at a temperature near the operation temperature of the purification column (400-600°C) in order to affect the predictable result of decreasing the energy demand of the purification column and thus the cost.

In regard to claims 17-20, see above for the limitations of claim 2, 4, or 5. GB'271 teaches 12.5 Nm^3 of steam/ 154 kg of silica in example 1. The density of steam at this condition is 0.590 kg/m^3. Thus, GB'271 teaches the amount of steam that is introduced is 0.048 kg(/hr) per kg of metal oxide particles.

Response to Arguments

Applicant's arguments filed 2/3/2009 have been fully considered but they are not persuasive.

Applicant argues that it would not have been obvious to one of ordinary skill in the art to use a temperature no greater than 150°C because the temperature range of 200-500°C as disclosed in GB'271 is described as being used in a rotating tube, screw conveyor, or an endless steel bed.

However, obviousness only requires a reasonable expectation of success. In the instant case, one of ordinary skill in the art would expect that a process temperature that is effective in one apparatus would be effective in another apparatus for the same reaction. See MPEP 2143.02 I. Moreover, no evidence has been presented that proves or suggests that such a reaction temperature would not be effective, and attorney arguments cannot take the place of evidence in proving inoperability of the prior art. See MPEP 716.01(c).

Furthermore, temperature is a parameter routinely optimized in the chemical art and generally does not support patentability unless there is evidence indicating that such a temperature is critical. Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In the instant case, the general temperature conditions of the claim are disclosed by the prior art as described above and the claimed temperature range has not been shown to be critical, thus the claimed maximum temperature range is not

considered to patentably distinguish the claims from the prior art. See MPEP 2144.05 II. A. Moreover, selection of a process temperature is a matter of design choice and routine optimization that fails to produce an unexpected result. In particular one of ordinary skill in the art would have been motivated to lower the temperature in order to decrease energy costs.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cole '149 teaches a similar process of purifying titanium dioxide particles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ajz

/Steven Bos/
Primary Examiner, Art Unit 1793